ARCHITECTURE DECISION RECORD (ADR)

Decision Summary: Establish the Center of Excellence (CoE) for Containerization

Approved by the VA Chief Architect (OIT/OCTO) on 10/03/2025

Context

Historically, VA programs and platforms have implemented containers independently, only having to adhere to general security mandates. With container technologies increasing use to modern application architectures, this fragmented adoption of container platforms, orchestration models, and Development, Security, and Operations (DevSecOps) tooling has impacted security, interoperability, and operational efficiency, resulting in:

- Lack of Standardization for containers/platform
- Redundant container image development and hardening efforts
- Duplication of Continuous Integration and Continuous Delivery/Deployment (CI/CD) pipelines and tooling across domains
- Inconsistent networking, service discovery, and deployment patterns
- Missed opportunities for reuse, cost savings, and accelerated Authority to Operate (ATO)

To address these challenges and unify VA's containerization practices, the TPT Executive Committee-approved Containerization Strategy, establishes VA's direction for standardizing on Elastic Kubernetes Service (EKS) and Azure Kubernetes Service (AKS), Podman used with Windows Subsystem for Linux 2 (WSL2), retaining OpenShift as a legacy option, and institutionalizing reuse and governance through a Center of Excellence (COE) for Containerization.

This Architecture Decision Record (ADR) operationalizes the VA Containerization strategy by formally establishing the COE for Containerization structure, responsibilities, and leadership model required to drive container strategy implementation and governance across the VA enterprise.

Decision

Establish a COE for Containerization to implement contractor incentive mechanisms as outlined in the Containerization Strategy across the VA enterprise, implement a contractor incentivization program as described in the container strategy, and standardize on container technologies (i.e. CSWF platforms, development tools, etc).

The CoE team will:

- Publish and maintain a catalog of VA-approved, hardened base container images in code.va.gov. IO will harden the images and will coordinate with CSWF team to ensure they are configurable to the platforms
- Define and enforce container image creation, deployment, led by IO and work with AES Technology Reference Model (TRM) team for container approval standards and whitelisting
- Operate a registry (e.g., Elastic Container Registry (ECR)/Azure Container Registry (ACR)) for container reuse, security updates, and patch inheritance led by IO and representation from CSWF platform teams
- Ensure platform security and compliance to streamline ATO processes using pre-approved, reusable artifacts for container reuse security control inheritance, done by the CSWF platform teams with coordination from IO
- Maintain containerization strategy and requirements, led by AES with input from IO and CSWF platform teams.
- Standardize local container development on Podman.
    - Please note that, for Windows-based machines, WSL2 must be enabled and configured.
    - The latest approved version of Podman is documented in the TRM Podman analysis found here - https://trm.oit.va.gov/ToolPage.aspx?tid=14897

Rationale

A unified COE for Containerization Team provides the centralized leadership, governance, and enablement capacity needed to implement container reuse, enforce platform standards (e.g., EKS, AKS, OpenShift), and streamline delivery pipelines to accelerate achievement of VA's enterprise modernization objectives. The rationale for this decision includes:

- Standardization and Governance: Establishing enterprise-approved, hardened base container images and standardized CI/CD patterns ensures architectural consistency and reduces duplication across product teams.
- Accelerated Authority to Operate (ATO): By supporting pre-approved artifacts and reusable hardened containers, the COE for Containerization enables security control inheritance, reducing time and cost required for ATO processes.
- Improved Reuse and Contribution: The COE for Containerization promotes Source Code Harmonization and Reuse in Information Technology Act (SHARE IT Act) compliance through centralized registries, scoring mechanisms, and contract audits that reward container reuse and modular design.
- Operational Efficiency and Cost Savings: Container reuse, centralized registries, and image lifecycle governance reduce hosting costs, accelerate deployments, and free engineering capacity for mission-focused value delivery.
- Developer Enablement: The COE for Containerization will enable self-service deployment models through cataloged templates, curated pipelines, and published patterns, making it easier for product teams to build secure, scalable solutions quickly. Also standardizing on developer tools, such as Podman with WSL2 on windows GFEs will enable developers to be more productive and deliver faster and more secure solutions for all product teams.

Impact(s)

The overall impact is a streamlined platform that supports a guided self-service capability for developers that balances enterprise control with product team autonomy through:

- Catalog of approved containers (code.va.gov)
- TRM approved foundational container images
- Registry of hardened reusable containers (ECR/ACR)
- Streamlined Authority to Operate (ATO)
- Updated contractual Quality Assurance Surveillance Plan (QASP) templates to track and incentivize container reuse
- Onboarding and training of application teams and contractors on reuse and governance expectations

Consolidating container technology through an enterprise-wide development approach using a unified technology stack such as Podman with WSL2, AKS/EKS, and standardized CI/CD pipeline to create gold-image standard containers, VA will reduce infrastructure overhead and streamline DevSecOps workflows. This reduces cloud hosting costs, mitigates duplication of effort, and frees up engineering resources to focus on value creation.

For questions or further clarification, contact the Enterprise Architecture team at **ea@va.gov**

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This ADR does not establish the recommended tool as the exclusive solution for the defined use case. Other tools that meet VA requirements may continue to be used or evaluated as part of VA's enterprise technology strategy. Cost considerations, licensing agreements, and operational support for any tool remain the responsibility of the respective program offices and stakeholders.